

Gold King Mine

Revised Approach for Construction

We started the Gold King project in September of 2014. There are several changes that have been identified once we started the excavation of the portal. Listed below are those changes and the revised approach to the construction of the portal area.

- 1.) Ramp up approximately 12' to reach the top of the high wall.
- 2.) Excavate loose material from the top of the high wall.
- 3.) Drill in wire mesh anchors.
- 4.) Hang wire mesh on the high wall as we excavate to the sill of the portal.
- 5.) Excavate to the sill and into the competent rock face at the portal.
- 6.) Install bedding material for a 20' length of 10' diameter culvert section.
- 7.) Install a 20' length of 10' diameter culvert section.
- 8.) Seal the culvert at the rock face.
- 9.) Backfill the culvert over the top with 2' back 5' from the rock face, and 5' high on both sides for 15'.
- 10.) Install utilities for underground operations
- 11.) Build access road for tunnel mucker.
- 12.) Support the brow at the portal.
- 13.) Muck and support 100' in-by the portal.

Revised approach for construction:

Harrison Western will mobilize the project with equipment and materials to accomplish the work listed above. We will then build a ramp up approximately 12' to enable us reach the top of the high wall above the portal. We will excavate all the loose from the top of the high wall back about 5' from the edge of the high wall. We will install 4' long resin anchors to support the wire mesh, there will be about 16 of these. We will hang wire mesh from these anchors, approximately 1250 square feet of mesh material. As we excavate the ramp material back down and away from the portal we will allow the wire mesh to descend slopes around the portal. Occasionally we may have to install a few spot bolts to support the rock and the wire on the way down, this will be accomplished using 5' split-set bolts. We will continue this process until we have excavated to hard rock at the sill and portal, or hard rock at the portal and 2' below the elevation of the portal. We will install approximately 2' thick of bedding material from the rock face at the portal back 25' from the face and approximately 20' width. We are assuming there is suitable bedding material located on site. We will install 2-10' length X 10' diameter culvert sections, this culvert will be placed as close to the rock face as possible, leveled, and sealed at the rock face using belting attached to the rock face and the culvert section. We will place back fill material 2' over the culvert and 5' back from the portal area. We will then continue to back fill on both sides of the culvert sloping it down to the front edge of the culvert sections furthest from the portal. We are assuming that suitable backfill material can be found on site. At this point we will set up our equipment

and install utilities to the portal area. We intend to install a 4" airline, a 2" waterline, a 2" discharge line, a 12" ventilation line, and a 120v power line. We will then support the brow using either 5' split-set bolts or possibly steel sets. If steel sets are required we anticipate modifying existing steel sets that are stored close to the site. At this point we will muck and support the tunnel in-by from the portal for a distance of 100'. We are not sure at this point how much muck will have to be removed from the tunnel, or what type of support for the rock will be needed for the length of the tunnel.